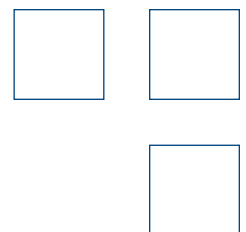


Configuration Software Manual

**ST100A Series
Thermal Mass Flow Meter**



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1. Introduction

The ST100A Series configuration software is a Windows PC application that lets you easily set up and configure the ST100A Series thermal mass flow meter. Use this tool for all instrument commissioning activity. Note that the software application serves both ST and MT series product lines. This manual, however, covers operation with ST100A Series only (software version 3.2.0.x).

2. Installation

Find the Software Configurator MSI install file in the Software folder on the product documentation CD or downloaded over the web. The file can be identified by name: *ST-MT-Configurator-v3220.msi*. Copy this file to a location on your PC designated for ST100A documentation.

Run the MSI installer file (make sure you have administrative rights to install) and follow the on-screen instructions to complete the installation (uninstall any previous version of the software first). The installation process places an application shortcut icon of a stylized meter face on the Windows desktop:  The installer also creates a folder in the Start Menu named *Fluid Components Intl*, which contains another program shortcut.

3. Operation

Remove the instrument's blind lid and connect the host PC via USB or Ethernet as required for your application:

- Use **USB** for local host PC connection to the instrument. Connect the instrument to the PC USB port using the USB cable provided. Plug the cable end with the square-shaped plug into the instrument's Type B USB connector J21. Locate this connector at the bottom edge of the main board as shown in the figure below. Plug the other end of this cable (flat plug) into the PC's USB port.
- Use **Ethernet** for remote applications in which the host PC communicates with the instrument over an Ethernet network. Connect a Cat-5 Ethernet patch cable to the instrument's RJ-45 connector J5 on the auxiliary board. Plug the other end of the cable to a 100Base-T compatible network switch or hub attached to your network.

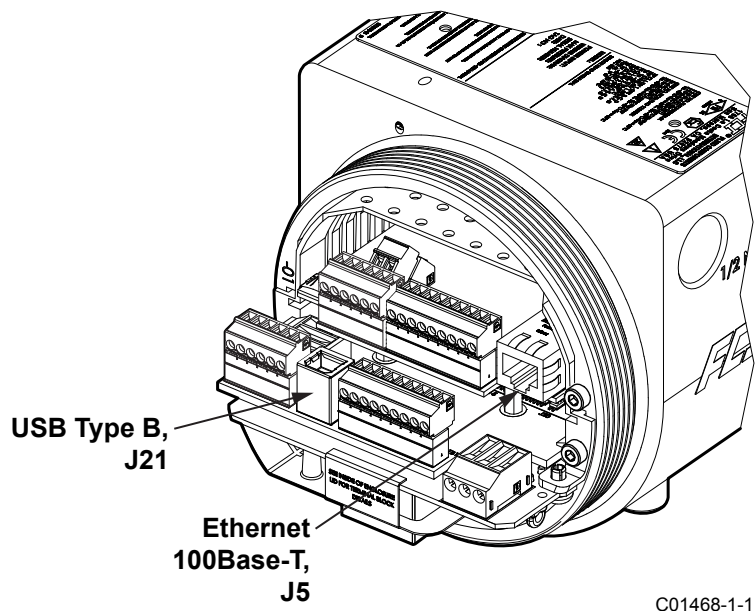


Figure 1 – ST100A Series Service Ports (Blind Lid Removed)

Note: To avoid any connection problems make sure the ST100A is fully booted before connecting to the instrument's service port and/or launching the ST100A configuration software.

Caution: A host PC connection to the ST100A is intended for temporary use only. Do not make the PC/network connection part of the permanent installation.

Double click the ST80/ST80L Configurator icon. The application opens to the Welcome screen as shown in the figure below. Click **USB Connect (Ethernet Connect** does not apply to ST80/ST80L) at the top of the screen to let the PC communicate with the instrument (with cable connection already made).

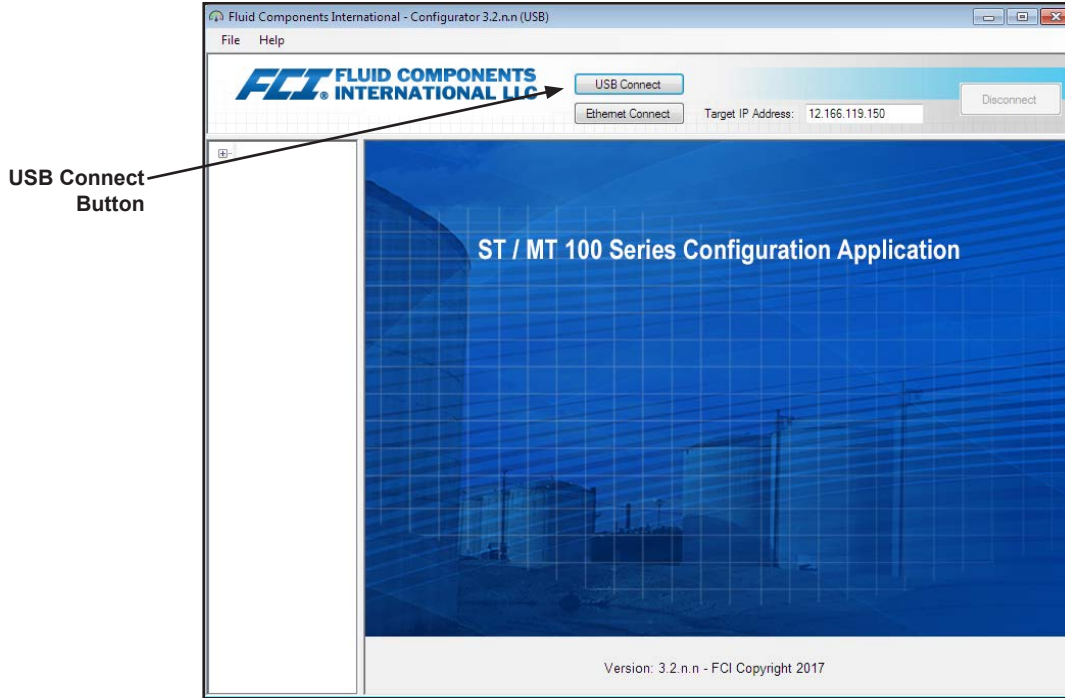


Figure 2 – Welcome Screen

Once connected, the application window shows the Process Data screen as shown in the figure below. The displayed information, which is the same as that shown on the HMI front panel display, includes the following:

- Flow as percent of range (scale)
- Flow with engineering units
- Total Flow (if Mass or Volumetric units used)
- Temperature
- Calibration Group **number** and Group **name**
- Alarm/Fault indicators

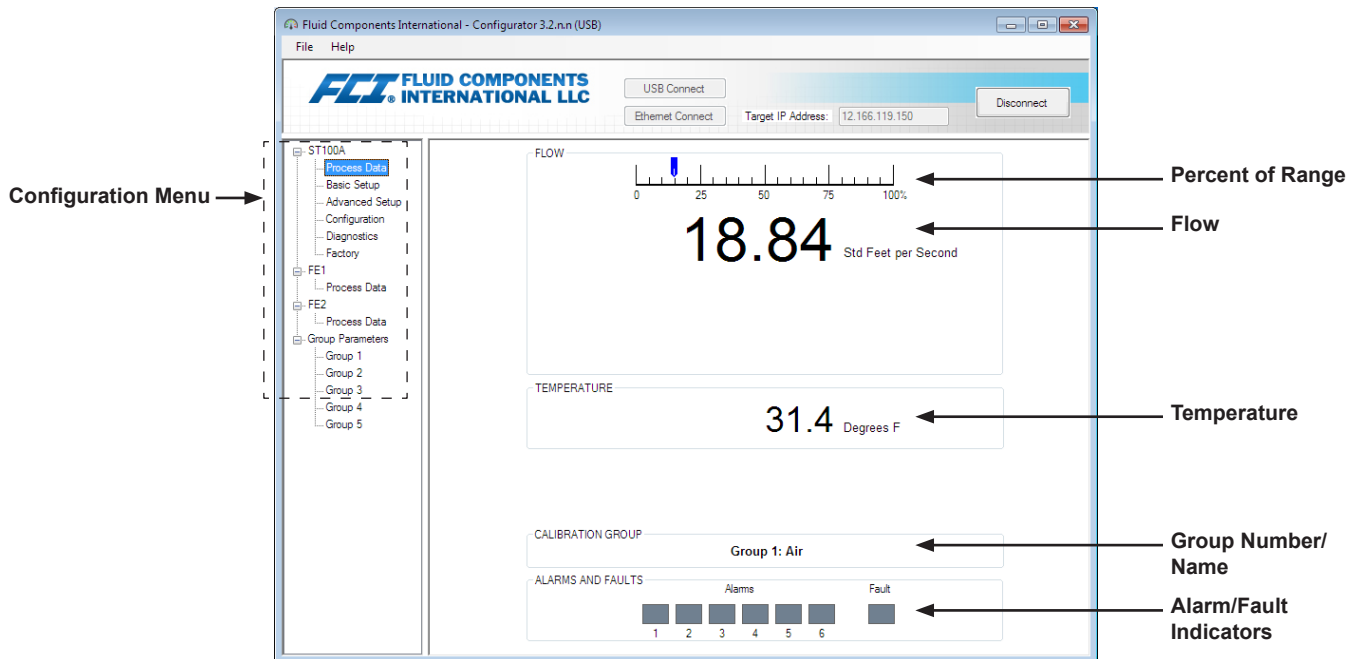


Figure 3 – Example Process Data Screen

Configuration Software Basics

The ST80/ST80L is set up using a configuration menu arranged in a hierarchical tree structure on the left side of the window. Select a menu item to see the related tabs on the right side of the window. Within the tab area parameter data is typically organized into one or more data fields, which are set off with a thin divider line or a thin box outline.

Many screens show **Get from Device** and/or **Send to Device** buttons at the bottom portion of the window. These buttons are shown if the window tab includes parameter data that can be retrieved from the instrument for display (**Get from Device**) and/or transmitted to the instrument for programming (**Send to Device**). The **Send to Device** button is normally grayed out (inactive) initially until a change is made in a data field. Once a parameter change is detected, the **Send to Device** button becomes active as shown by its solid appearance.

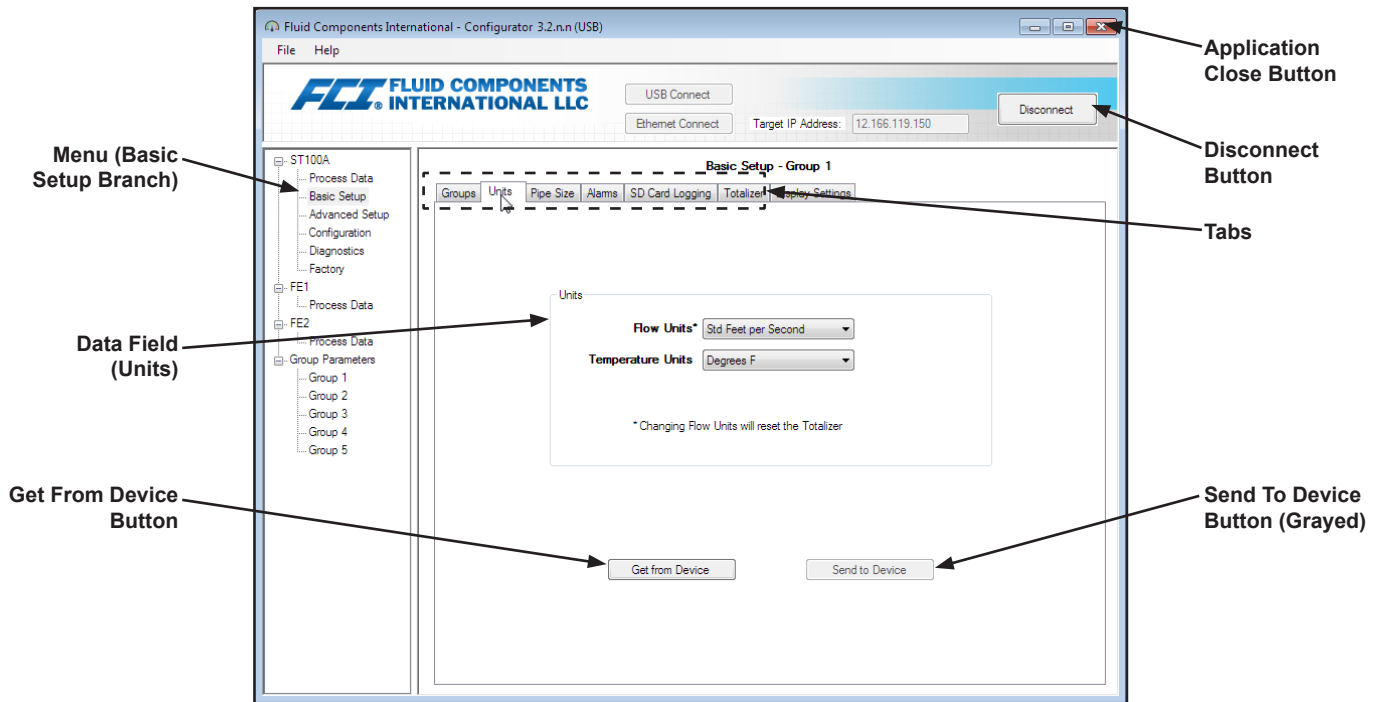


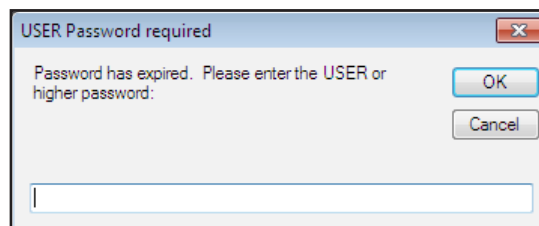
Figure 4 – Basic Application Screen Elements

Click **Disconnect** to break the connection between the PC and ST80/ST80L. Click the application window *Close* button or type ALT+F4 (with the application window having the focus) to quit the application altogether.

Note: Once the PC’s configuration software is communicating with the instrument, some HMI display items/menus are inactive due to control being handed over to the configuration application. For example, front panel selection of groups via the **MENU** button is inactive (inactive HMI display menu items are shown with an asterisk).

Password Protection

To protect against unwanted/unauthorized change, two levels of password protection are provided: *User* and *Factory*. The User level password is associated with common user-accessed parameters that can only be changed after entering the User password. The Factory level password is associated with more sensitive programming that can only be modified by the factory or its representatives. The dialog box for password entry is shown below. When prompted, type the password and then click **OK**. The User password is: 2772. The password is also shown in this manual with the tab summary tables.



Basic Setup Tab Screens

Select the **Basic Setup** branch on the menu tree to access basic setup items. The **Groups** tab is the first of several tabs across the top of the screen. Each tab provides a particular menu within the **Basic Setup** branch.

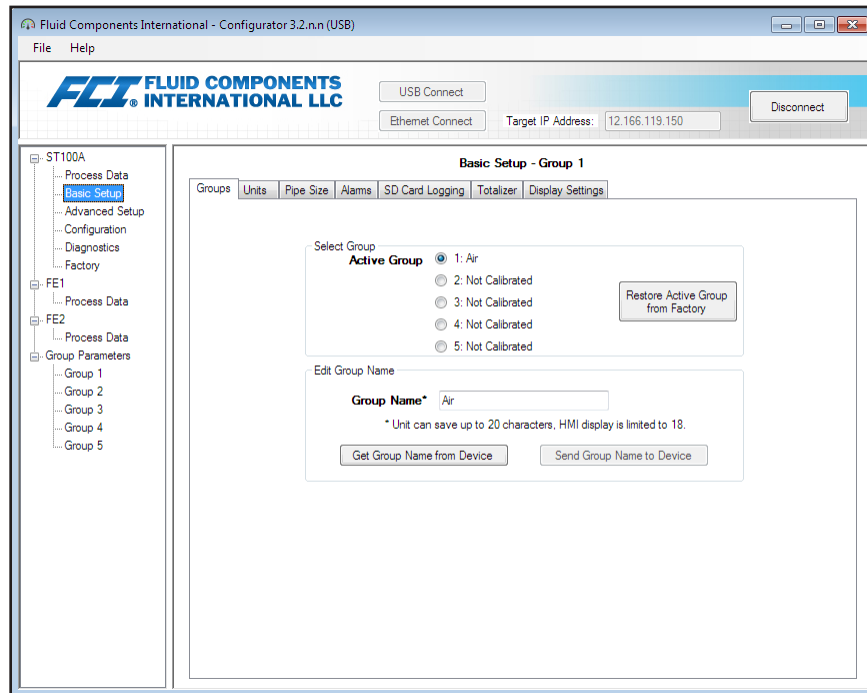


Figure 5 – Example Groups Tab (Basic Setup)

The table below summarizes the tabs within the **Basic Setup** branch.

Table 1 – Basic Setup Tabs

Tab Name	Tab Description	Password Level
Groups	Select and name groups. Switching between established groups takes place immediately once the radio button is clicked (no password required).	User
Units	Select flow and temperature units.	User
Pipe Size	Select pipe type and dimensions.	User
Alarms	Select and set alarm requirements.	User
SD Card Logging	Select logging requirements. Refer to <i>Process Data Logging</i> in the Operation section of the main manual 06EN003480 for details on how to use this feature.	User
Totalizer	Select and reset Totalizer requirements.	User
Display Settings	Adjust the HMI display. Tick the “Rotate Display 90 Degrees Clockwise” box and then click Send To Device to rotate the display 90 degrees (repeat as required). Move the Display Contrast slider as required (left = min.; right = max.) and then click Send to Device to change the display contrast.	User

[User password 2772]

To verify the current configuration of any setup parameter, click **Get from Device** on any of the Setup menus. After changing any of the setup parameters, click **Send to Device**. Click **Get from Device** again to verify the parameter(s) change. Observe that the changed parameters are now displayed. The remaining **Basic Setup** tab screens are shown below.

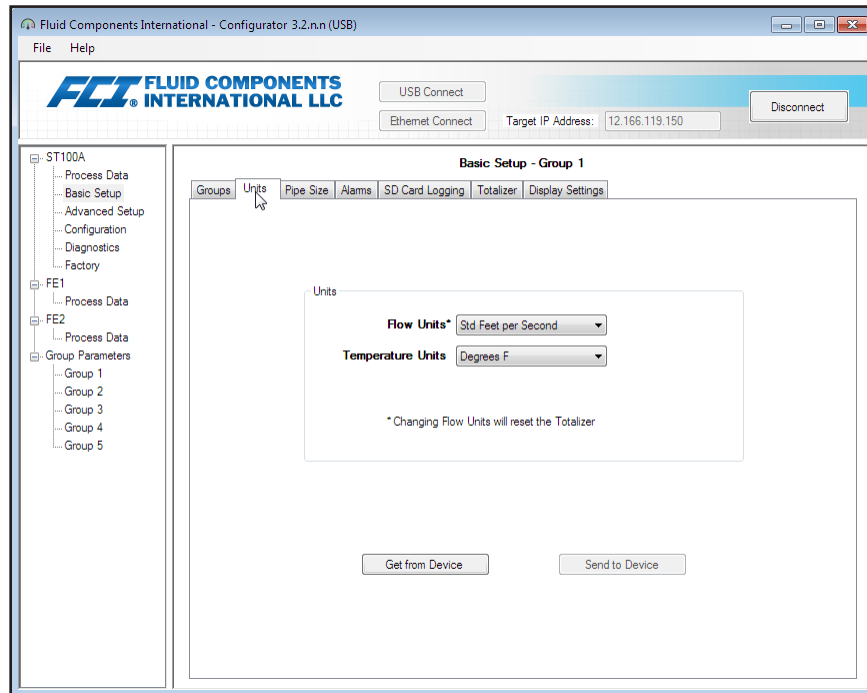


Figure 6 – Example Units Tab (Basic Setup)

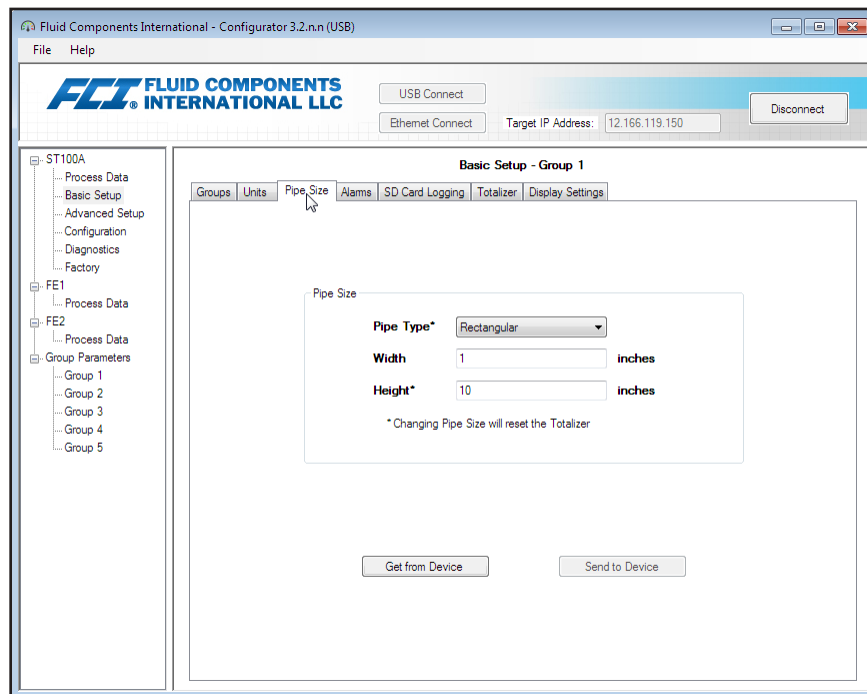


Figure 7 – Example Pipe Size Tab (Basic Setup)

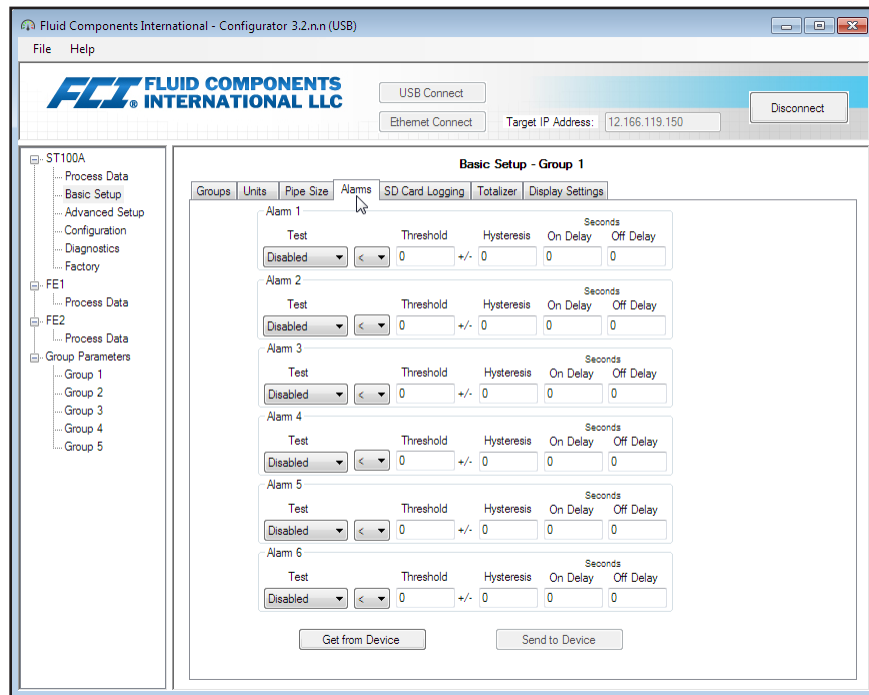


Figure 8 – Example Alarms Tab (Basic Setup)

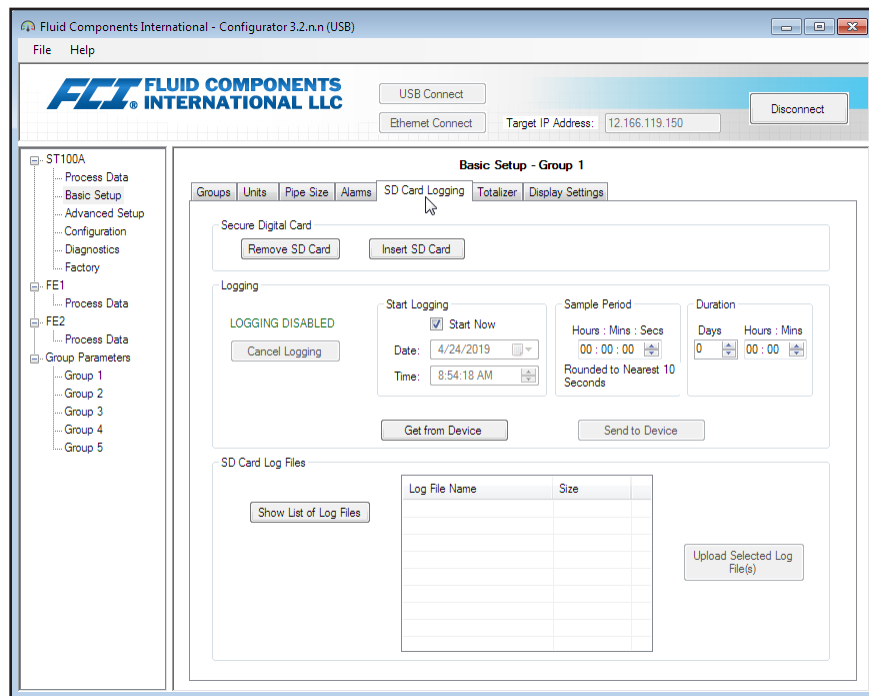


Figure 9 – Example SD Card Logging Tab (Basic Setup)

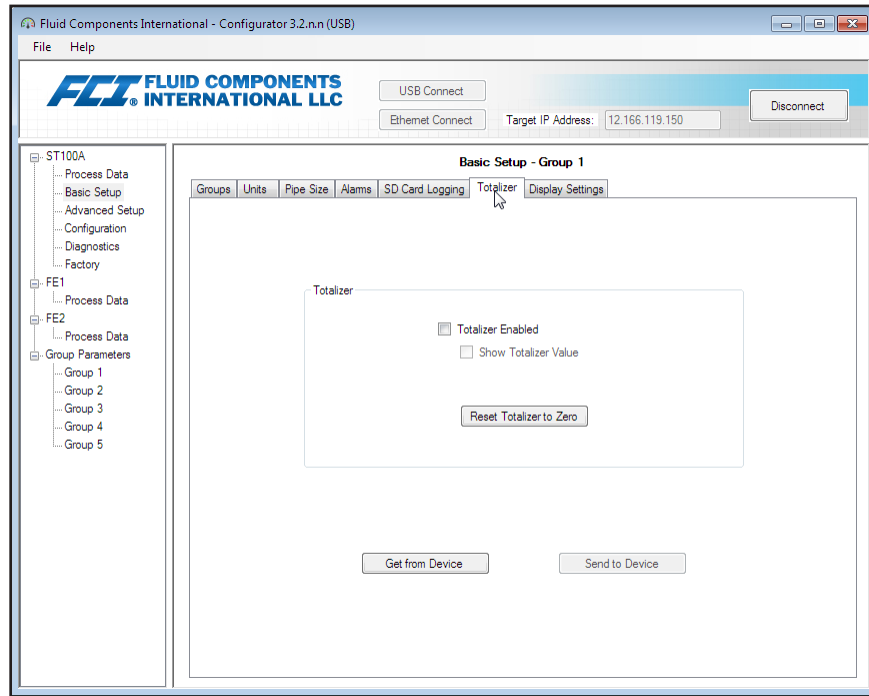


Figure 10 – Example Totalizer Tab (Basic Setup)

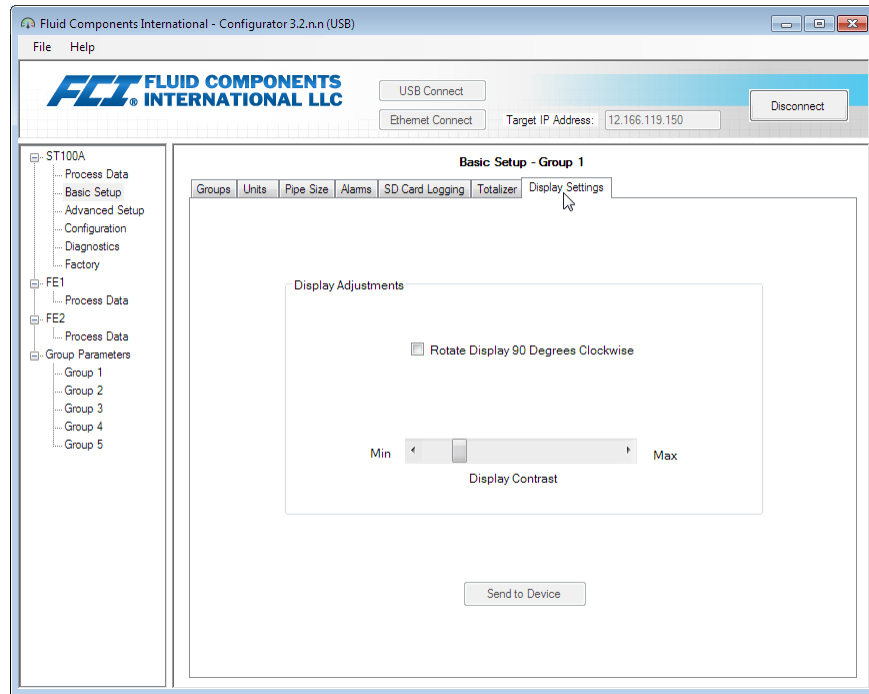


Figure 11 – Example Display Settings Tab (Basic Setup)

Advanced Setup Tab Screens

Select the **Advanced Setup** branch on the menu tree to access advanced setup items. The **User Parameters tab** is the first of several tabs across the top of the screen. Each tab provides a particular menu within the **Advanced Setup** branch.

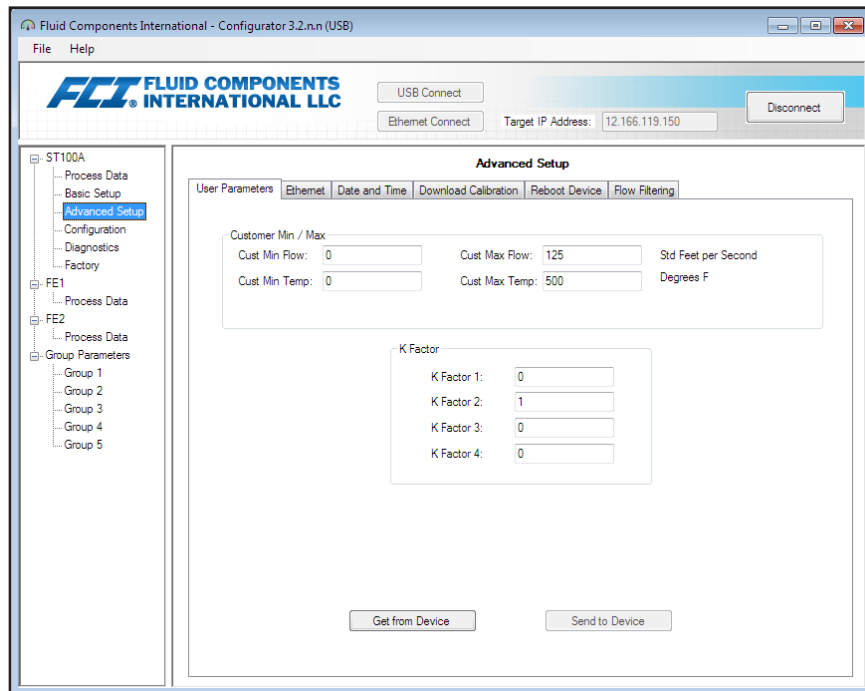


Figure 12 – Example User Parameters Tab (Advanced Setup)

The table below summarizes the tabs within the **Advanced Setup** branch.

Table 2 – Advanced Setup Tabs

Tab Name	Tab Description	Password Level
User Parameters	Shows min/max process variable limits and K Factor.	User
Ethernet	Sets Ethernet address values (unit IP address, gateway address, and subnet mask).	User
Date and Time	In the <i>Date and Time</i> field, set the date using the drop down calendar date picker and the time using the spinner controls. Alternatively, click Set to System Date/Time to copy the host PC system's date/time and transmit it to the instrument's battery-backed real time clock. See <i>Real Time Clock</i> in the Operation section of the main manual 06EN003480 for more information.	User
Download Calibration	Lets users download a full calibration to their ST100A via a text file. Contact FCI to obtain the .txt file that was generated by the factory linearization software (Cal2). See "Download Calibration" on page 10 for details on how to download the calibration file.	User
Reboot Device	Click Reboot Device to perform a warm boot of the ST100A. Be aware that rebooting the instrument affects device outputs and interrupts communications.	User
Flow Filtering	Sets flow filtering via Flow Output Damping ¹ and/or Flow Input Moving Average Filter ² . Refer to <i>Flow Filtering</i> in the Operation section of the main manual 06EN003480 for details on these features.	User

Note 1. Flow damping smooths out flow signal output. Flow response is reduced with high flow damping values.

Note 2. The flow input moving average filter smooths out the input flow signal using a moving average (boxcar) filter that averages the last X number of readings.

[User password 2772]

To verify the current configuration of any setup parameter, click **Get from Device** on any of the Setup menus. After changing any of the setup parameters, click **Send to Device**. Click **Get from Device** again to verify the parameter(s) change. Observe that the changed parameters are now displayed. The remaining **Advanced Setup** tab screens are shown below.

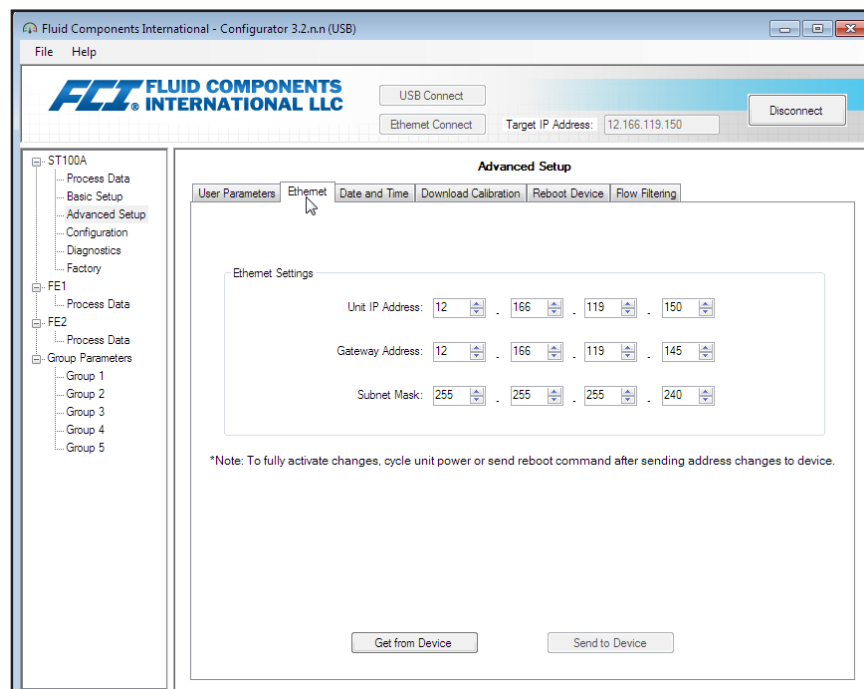


Figure 13 – Example Ethernet Tab (Advanced Setup)

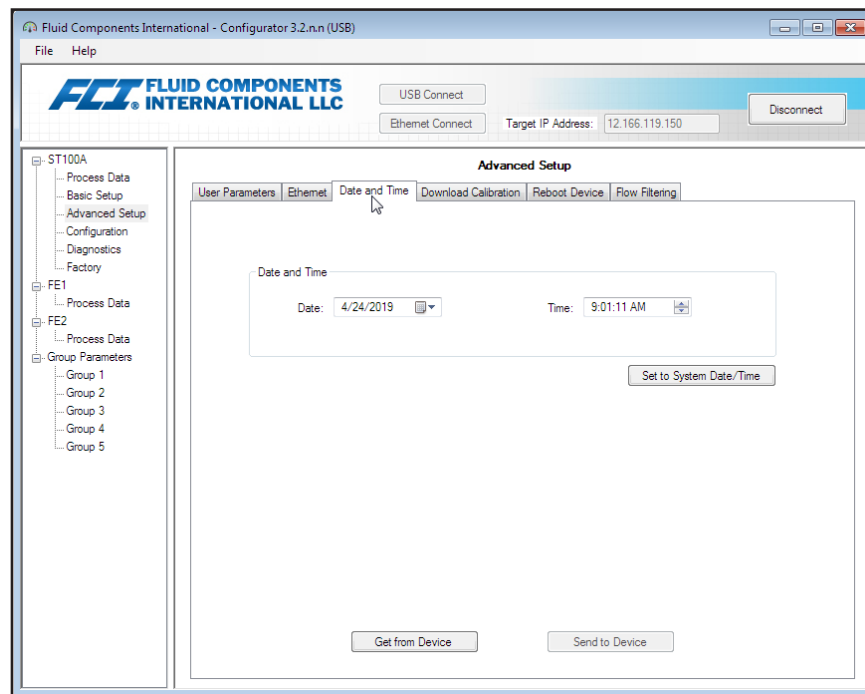


Figure 14 – Example Date and Time Tab (Advanced Setup)

Download Calibration

Follow these steps to download the calibration file directly to the instrument. Refer to the screen shown in “Figure 15 – Example Download Calibration Tab (Advanced Setup)” on page 11.

1. In the *Get Calibration File* field, click **Browse...**
2. Observe that an Open File dialog appears. Navigate to the Cal2-generated text file’s directory/folder (local drive or network), select the appropriate file, and then click **Open**. Observe that the text box shows the file’s path.
3. In the *Select Group For Download* field, use the drop down list to select the applicable group.
4. In the *Select FE For Download* field, use the drop down list to select the FE (FE1 or FE2).
5. Click **Send to Device** (enter User password as required).

Note: The calibration file is a text file with the following default filename format:

SerialNo_CustomerNo_CalGroup_FE/Head.txt.

Example: For an instrument with serial number 492890, customer number C076370, calibration group 1, and a single FE/head, the calibration file filename would be: *492890_C076370_1_1.txt.*

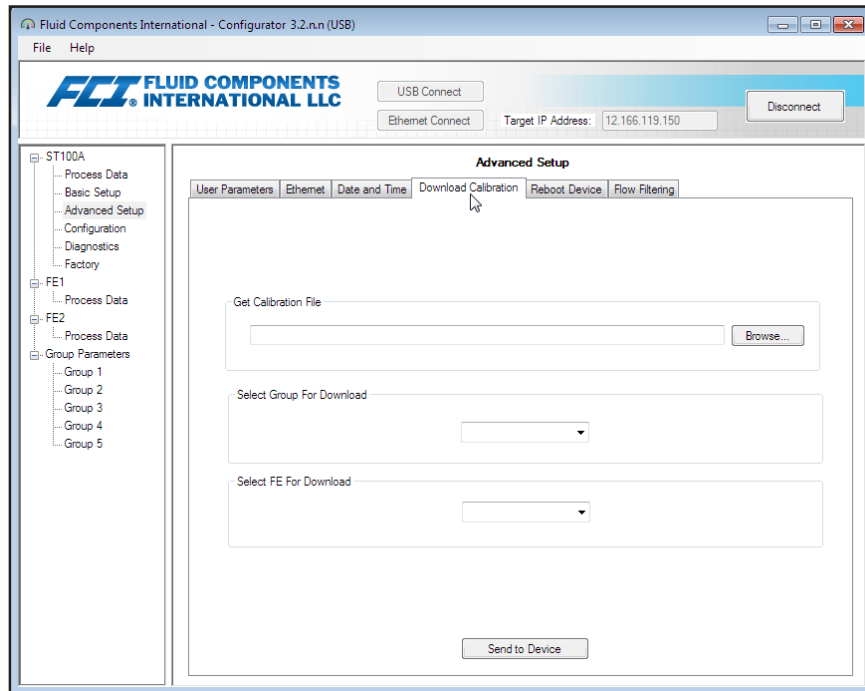


Figure 15 – Example Download Calibration Tab (Advanced Setup)

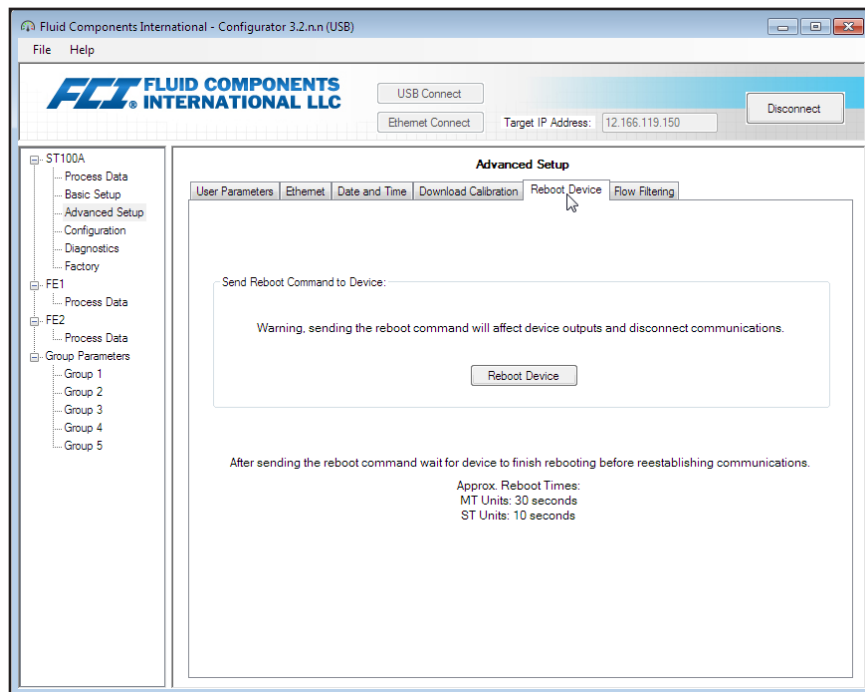


Figure 16 – Example Reboot Device Tab (Advanced Setup)

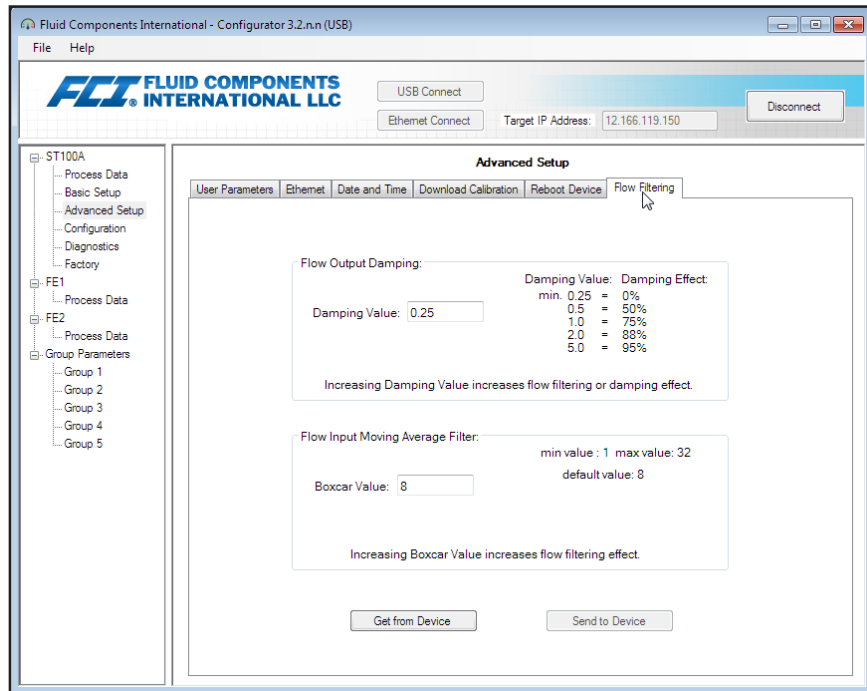


Figure 17 – Example Flow Filtering Tab (Advanced Setup)

Configuration Tab Screens

Select the **Configuration** branch on the menu tree to access configuration setup items. The **Output** tab is the first of several tabs across the top of the screen. Each tab provides a particular menu within the **Configuration** branch.

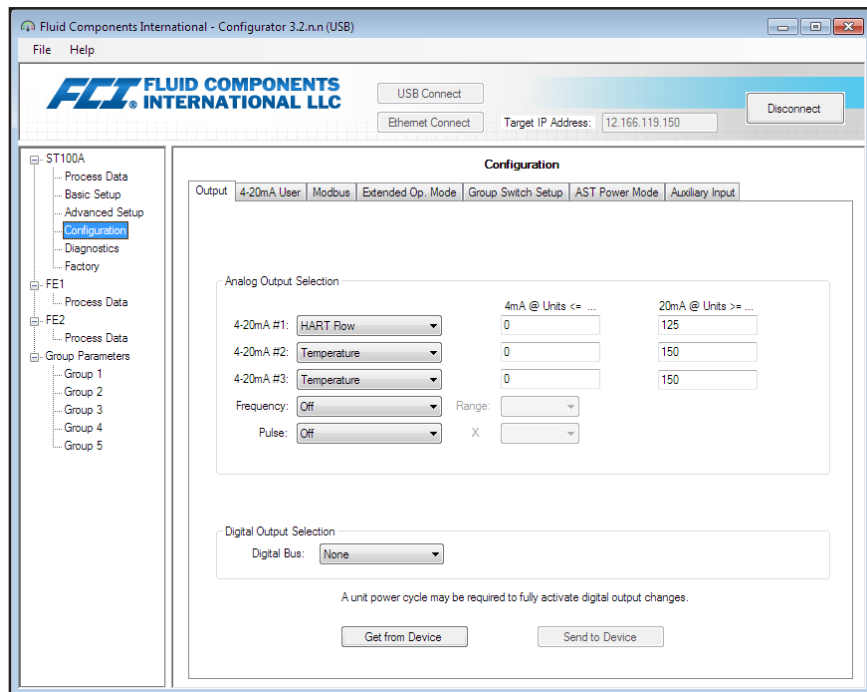


Figure 18 – Example Output Tab (Configuration)

The table below summarizes the tabs within the **Configuration** branch.

Table 3 – Configuration Tabs

Tab Name	Tab Description	Password Level
Output	Sets: 4-20 mA channels parameter and units assignment ¹ , and digital bus selection (Modbus or FF/Profibus) ² .	User
4-20 mA User	Manual mA Output loop check; configure/enable NAMUR fault. Note that an analog output must be set to Flow (in <i>Output</i> tab) for NAMUR parameters (including enable/disable checkbox) to display for that channel.	User
Modbus	Sets Modbus communication parameters.	User
Extended Op. Mode	Expands flow measurement capabilities by providing 3 additional modes of operation. Refer to <i>Extended Operation Modes</i> in the Operation section of the main manual 06EN003480 for detailed information.	User
Group Switch Setup	Sets up automatic calibration group switching depending on an external 4-20 mA output driving the ST100A auxiliary input port. Refer to <i>External Control Group Switching (EGS)</i> in the Operation section of the main manual 06EN003480 for detailed information.	User
AST Power Mode	Sets heater mode (AST or Constant Power) and max. heater current for AST (90 mA or 105 mA). The max. current value forms the threshold at which the instrument transitions to/from Constant Power mode. See <i>Configuring for AST™ or Constant Power Measurement Methods</i> in the Operation section of the main manual 06EN003480 for more information. Note that <i>VC</i> and <i>VD</i> data is for factory use only.	User
Auxiliary Input	Sets the configuration of the 4-20 mA auxiliary input.	User

Note 1. To set **HART** operation, select *HART Flow* from 4-20 mA #1 drop-down list (in *Analog Output Selection* field).

Note 2. Digital busses (includes HART, Modbus, and FF/Profibus) are mutually exclusive, meaning only one can be active at a time. Attempting to enable HART when Modbus or FF/Profibus is in effect causes the Digital Bus Deactivation Warning dialog to display: Click **OK** to make the change and force the Digital Output Selection to *None* or click **Cancel** to leave the setting unchanged. Attempting to enable Modbus or FF/Profibus when HART is in effect causes the HART Deactivation Warning dialog to display: Click **OK** to make the change and force the 4-20 mA #1 Selection to *Flow* or click **Cancel** to leave the setting unchanged.

[User password 2772]

To verify the current configuration of any setup parameter, click **Get from Device** on any of the Setup menus. After changing any of the setup parameters, click **Send to Device**. Click **Get from Device** again to verify the parameter(s) change. Observe that the changed parameters are now displayed. The remaining **Configuration** tab screens are shown below.

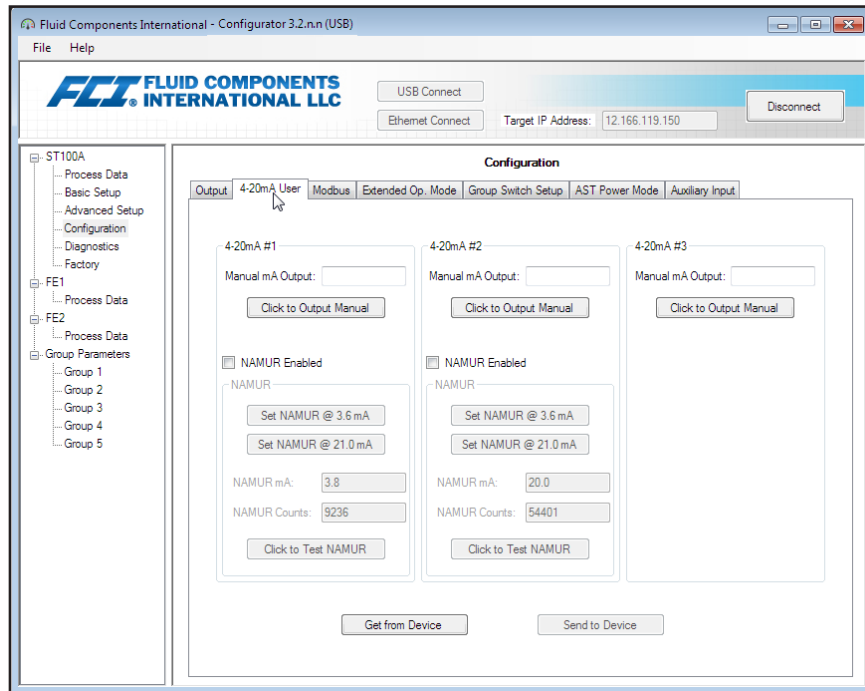


Figure 19 – Example 4-20 mA User Tab (Configuration)

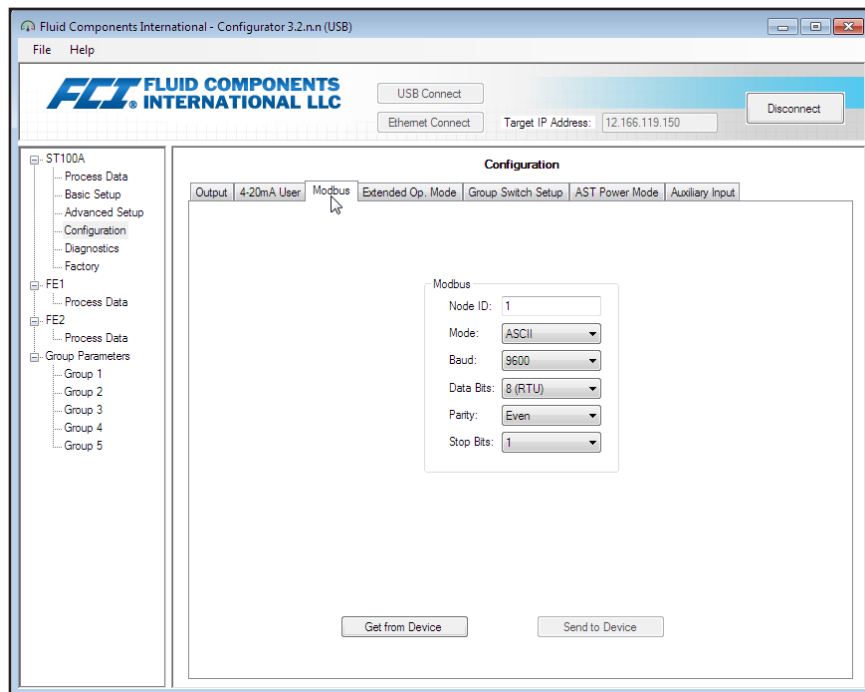


Figure 20 – Example Modbus Tab (Configuration)

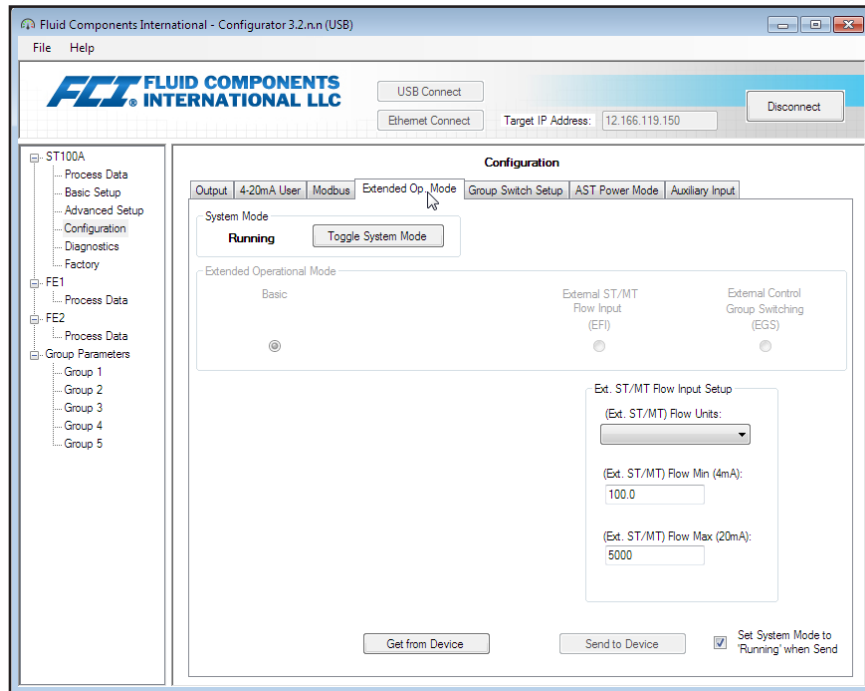


Figure 21 – Example Extended Op. Mode Tab (Configuration)

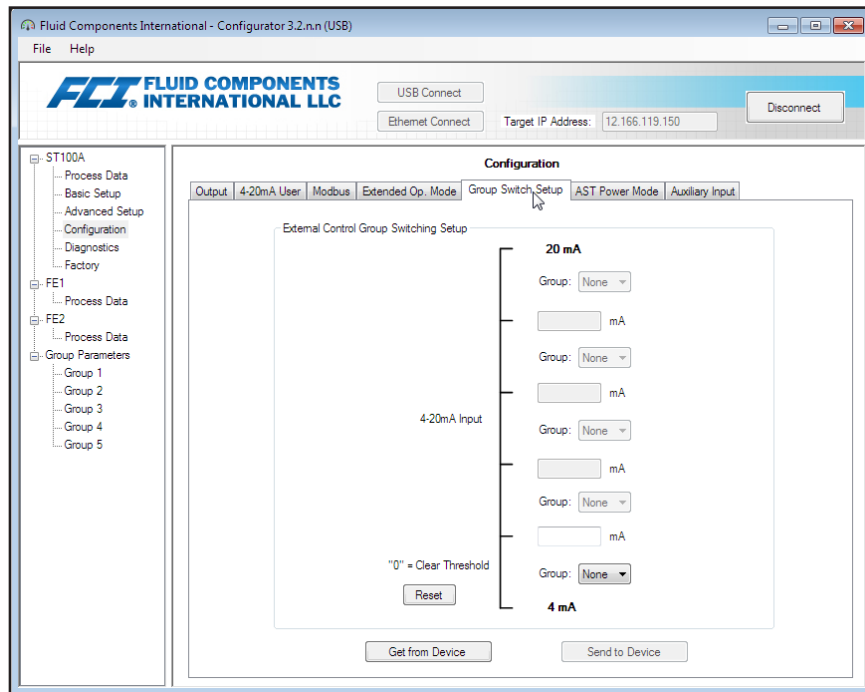


Figure 22 – Example Group Switch Setup Tab (Configuration)

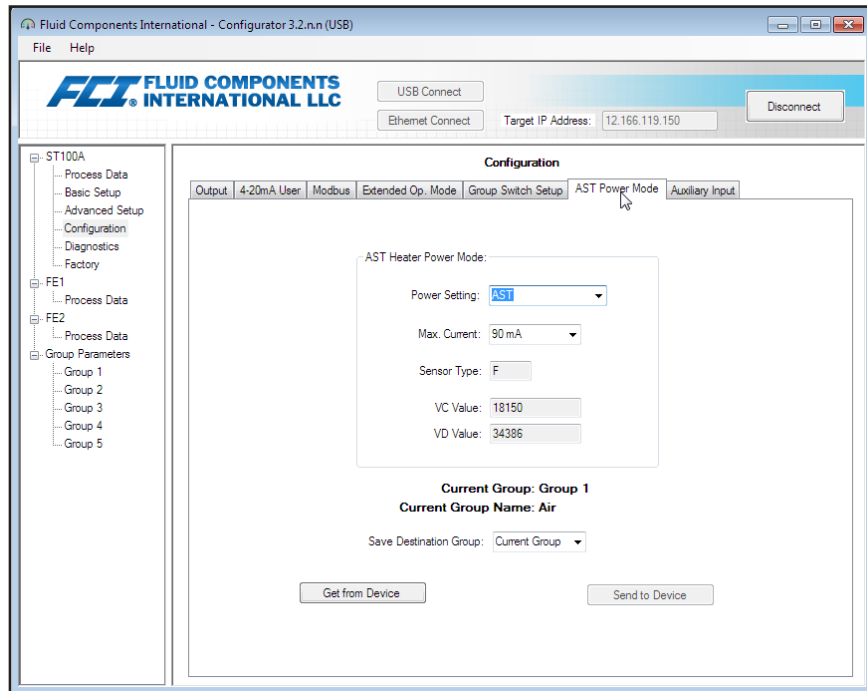


Figure 23 – Example AST Power Mode Tab (Configuration)

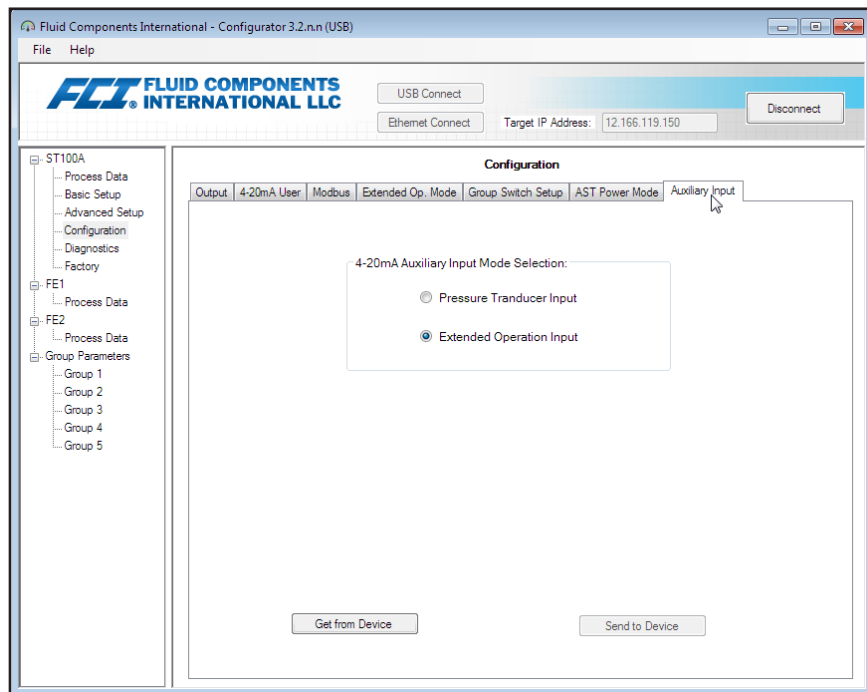


Figure 24 – Example Auxiliary Input Tab (Configuration)

Diagnostics Tab Screens

Select the **Diagnostics** branch on the menu tree to access diagnostic items. The **Status tab** is the first of several tabs across the top of the screen. Each tab provides a particular menu within the **Diagnostics** branch. The table below summarizes the tabs within the **Diagnostics** branch.

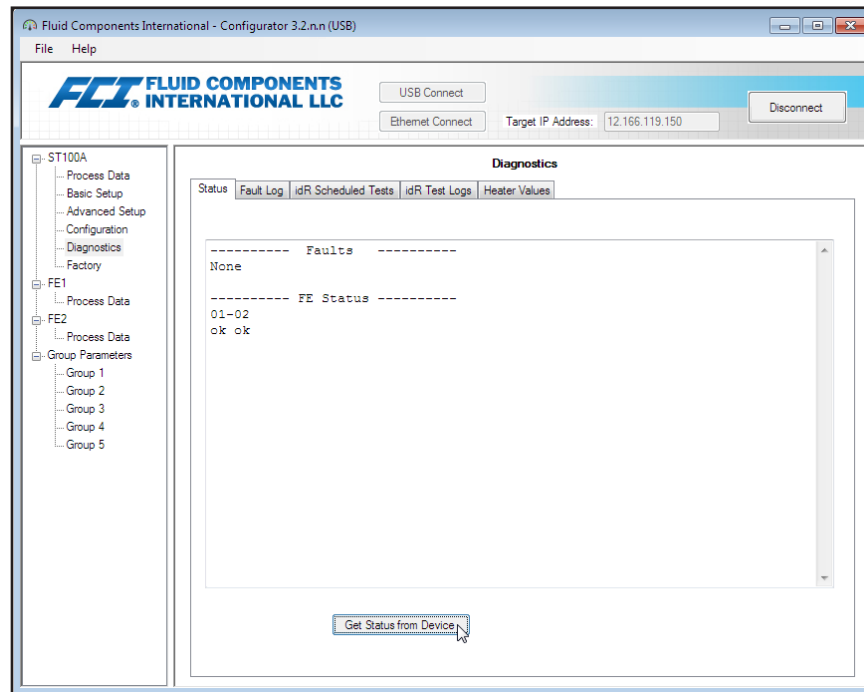


Figure 25 – Example Status Tab (Diagnostics)

Table 4 – Diagnostics Tabs

Tab Name	Tab Description	Password Level
Status	Indicates system status and fault flags. Click Get Status from Device to display the status.	Read only
Fault Log	Shows fault history. Click Get Fault Logs from Device to list the faults in the scrollable text box. Click Clear Fault Log to clear the log.	User
idR Scheduled Tests	For internal Delta R (idR) resistance check – Set pass/fail criteria, set FE1/FE2 output mode during test, schedule periodic idR test, display previous idR test results, and start idR test on-demand. Test results display in FE1 idR Test Results or FE2 idR Test Results field (table format) when done. See <i>Running the idR Check Using the ST100A Configuration Software</i> in the Operation section of the main manual 06EN003480 for more details on this screen.	User
idR Test Logs	Click Get Test Log from Device to show idR test results in the scrollable text box. Click Clear Test Logs to clear the log.	User
Heater Values	Shows heater status for the selected FE. Data shown includes heater resistance, heater voltage, and heater current (in mA). Click Start Data Loop to start the measurements for heater status. Note that status data does not show until Start Data Loop is clicked. Click Stop Data Loop to stop the heater status updates. Also, moving to another tab clears heater status data (if returning to the Heater Values tab, click Start Data Loop to redisplay heater status data). See <i>Check the Heater</i> in the Troubleshooting section of the main manual 06EN003480 for more details on this screen.	User

[User password 2772]

The remaining **Diagnostics** tab screens are shown below.

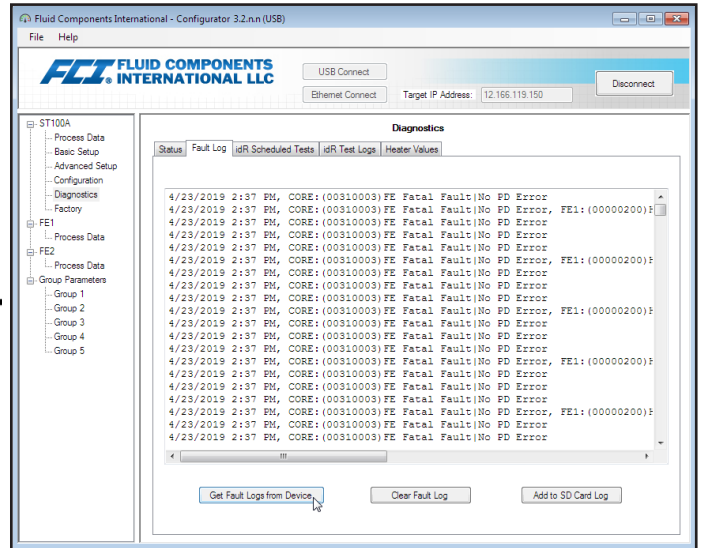
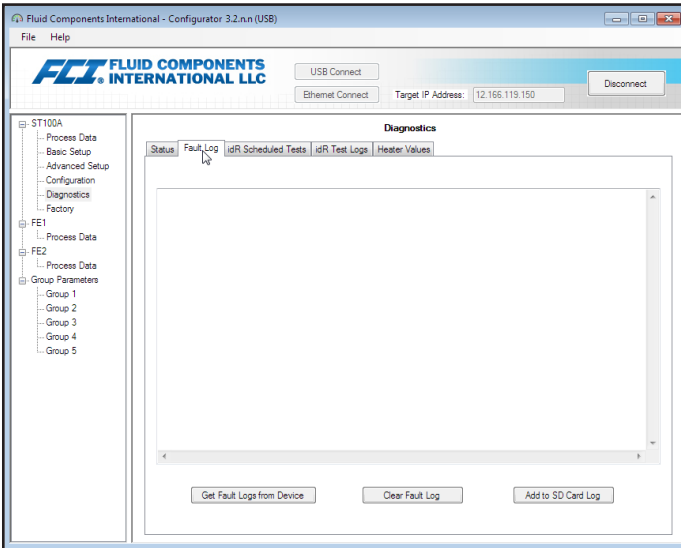


Figure 26 – Example Fault Log Tab and Example Fault Log List (Diagnostics)

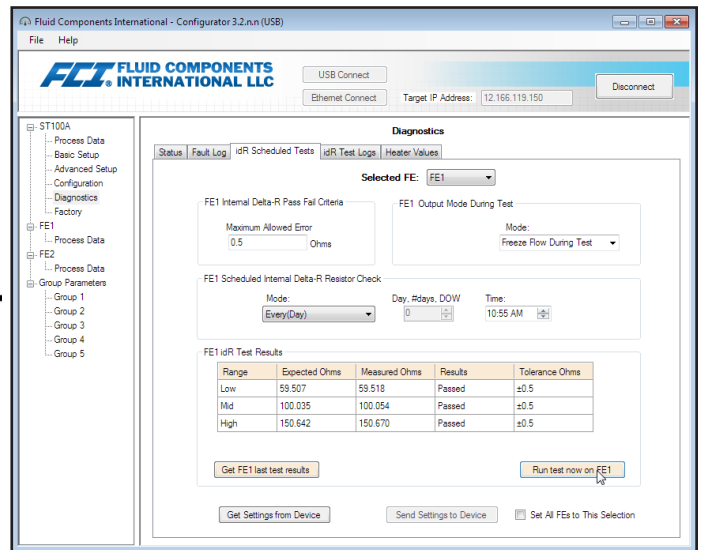
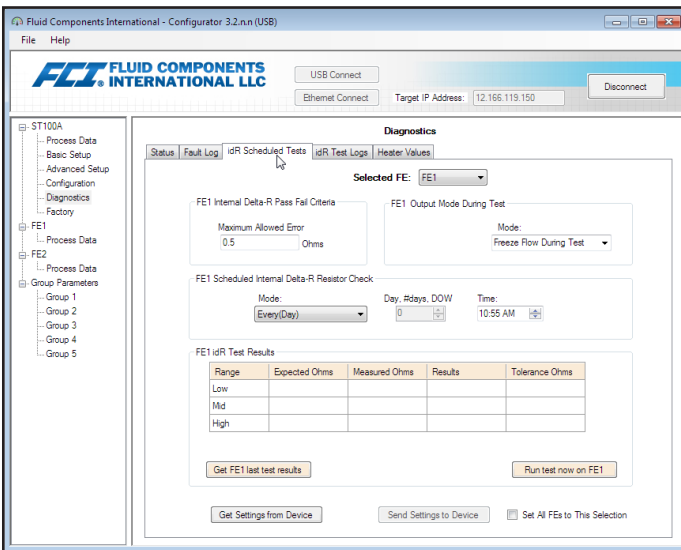


Figure 27 – Example idR Scheduled Tests Tab and Example idR On-Demand Test Results Display (Diagnostics)

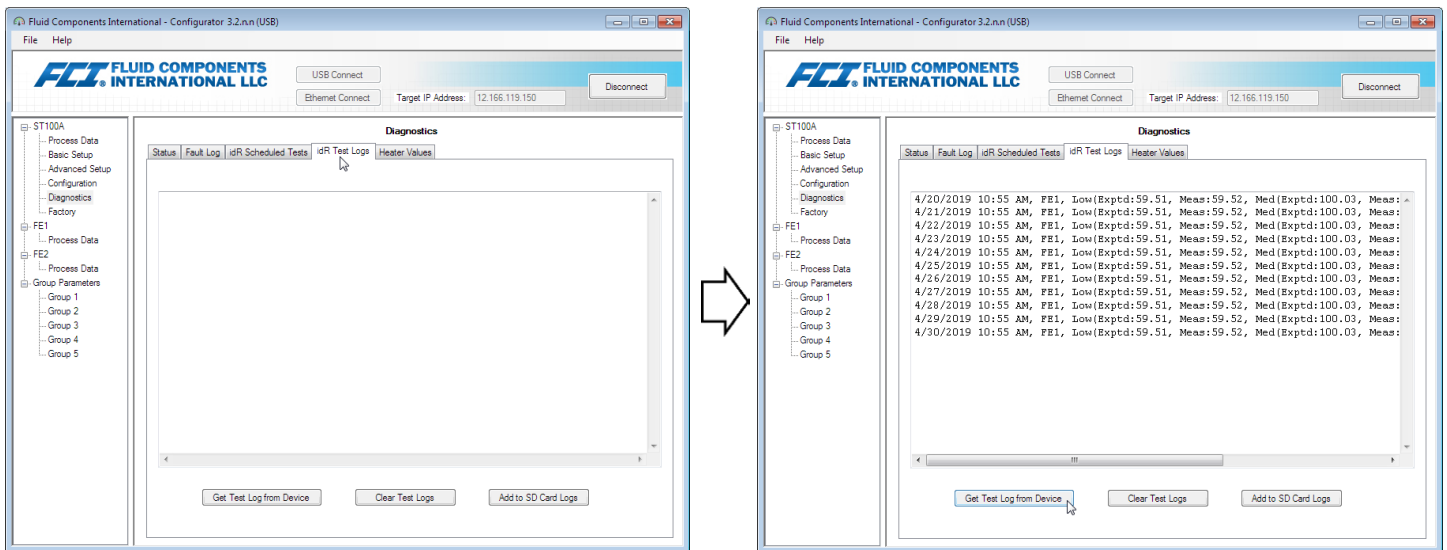


Figure 28 – Example idR Test Logs Tab and Example idR Test Log List (Diagnostics)

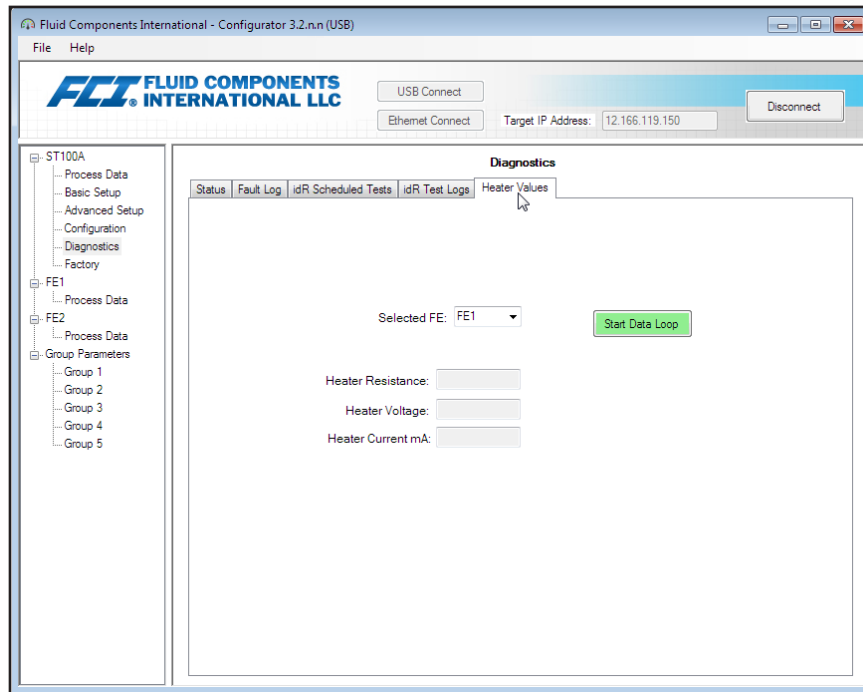


Figure 29 – Example Heater Values Tab (Diagnostics)

Factory Tab Screens

The **Factory** branch on the menu tree provides factory-only setup items. Only the factory or its representatives can change data in this group.

Table 5 – Factory Tabs

Tab Name	Tab Description	Password Level
Factory Parameters	Factory use only. (Calibrated Min/Max data.)	Factory
Identification	Factory use only. (Instrument ID data.)	Factory
4-20mA Factory	Factory use only. (4-20 mA output DAC count scaling and manual output control.)	Factory
Options	Factory use only. (Option inventory: display configuration, FE configuration [FE1 or FE2].)	Factory
HART	Factory use only. (HART ID info: electronics revision, HART ID, int. HART rev.)	Factory
Memory	Factory use only. (Erase various memory spaces.)	Factory
Reset idRs	Factory use only. (Click Run FEx idR Check for selected FE [FE1 or FE2], and then click Reset Expected idR Values to set displayed <i>Measured Ohms</i> values as new baseline for <i>Expected Ohms</i> values [observe that values in the <i>Internal dR Check Values</i> field disappear after Reset Expected idR Values is clicked].)	Factory
SIL Adj	Factory use only. (Adjusts calibration for accurate reading of power supply voltages [+24 VDC, +5 VDC] and 4-20 mA Output #1.)	Factory
FE Faults	Factory use only. (Select the FE from the dropdown list, then click Get Current FEx Faults to display the enable or trip status, or both, for all possible FE faults. In the screen's <i>Enabled</i> column, make any fault enable/disable change by checking (fault enabled) or unchecking (fault disabled) the box and then clicking Send FT Enabled Map Changes (requires Factory level password).	Factory
Core Faults	Factory use only. (Click Get Current Faults to display all possible core faults with trip status.	Factory

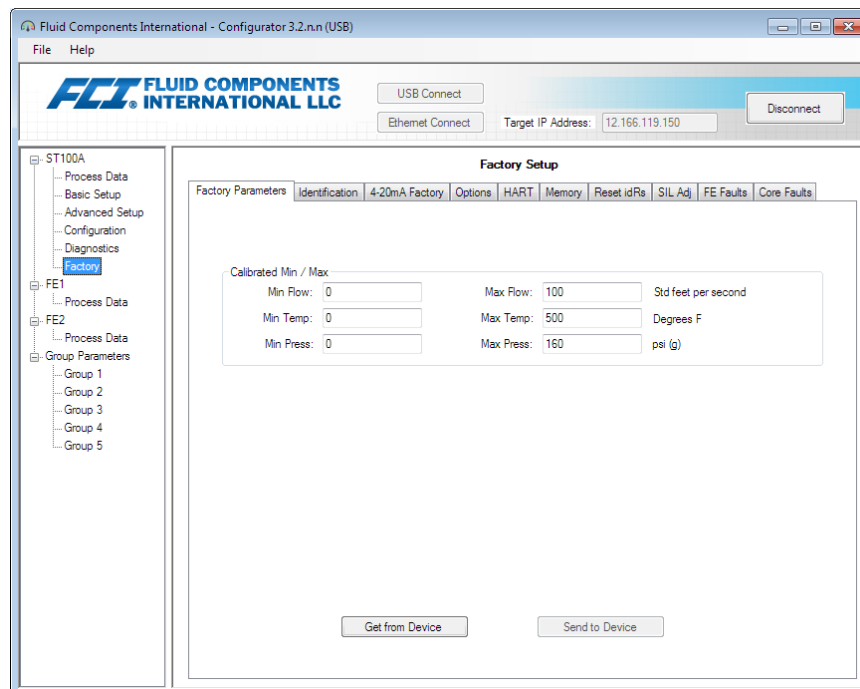


Figure 30 – Example Factory Parameters Tab (Factory)

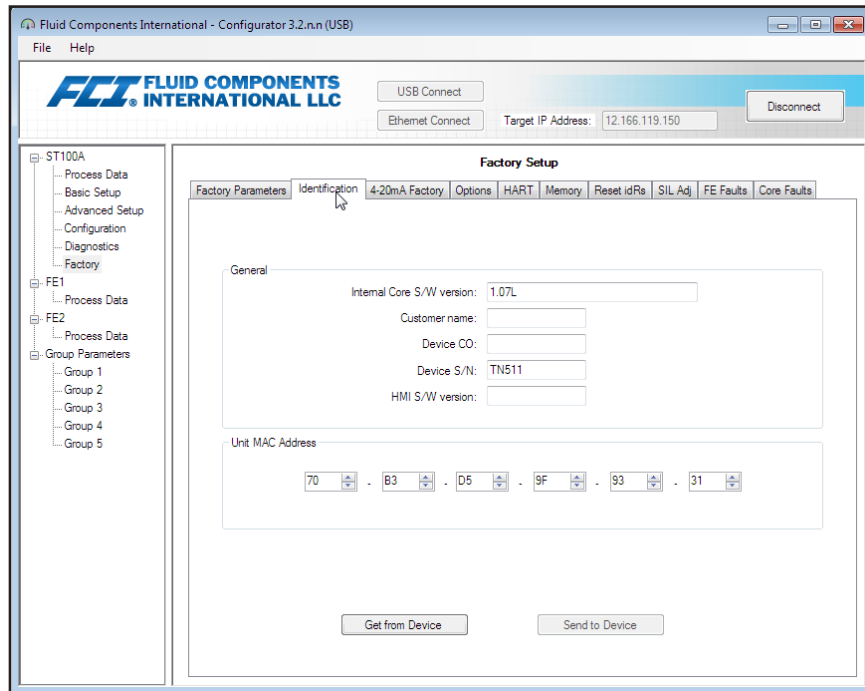


Figure 31 – Example Identification Tab (Factory)

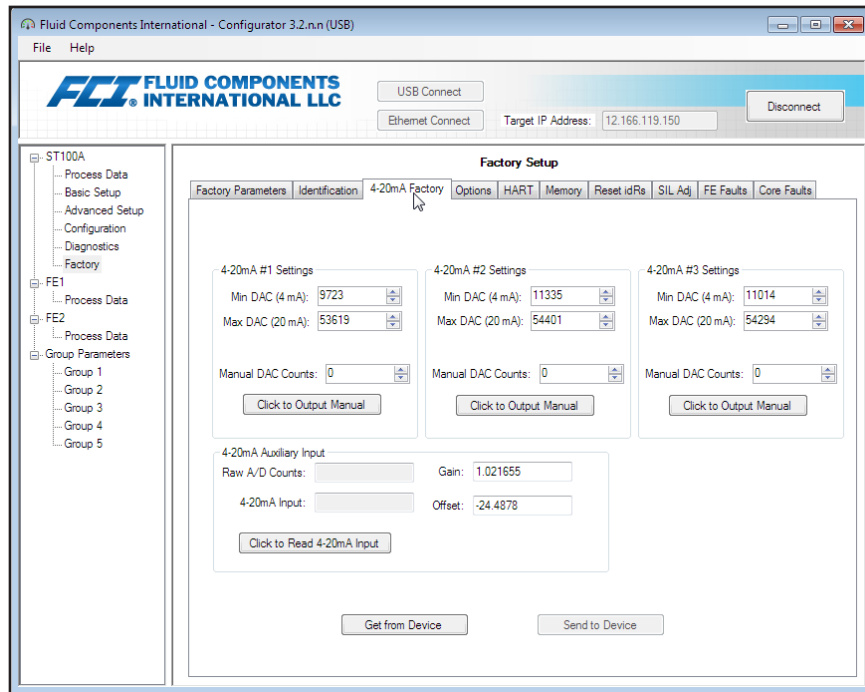


Figure 32 – Example 4-20mA Factory Tab (Factory)

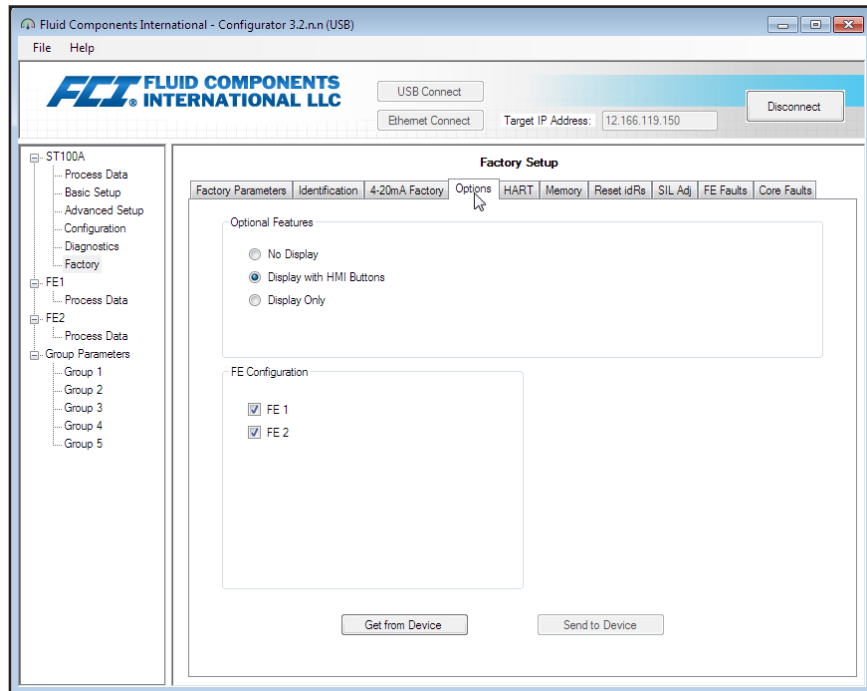


Figure 33 – Example Options Tab (Factory)

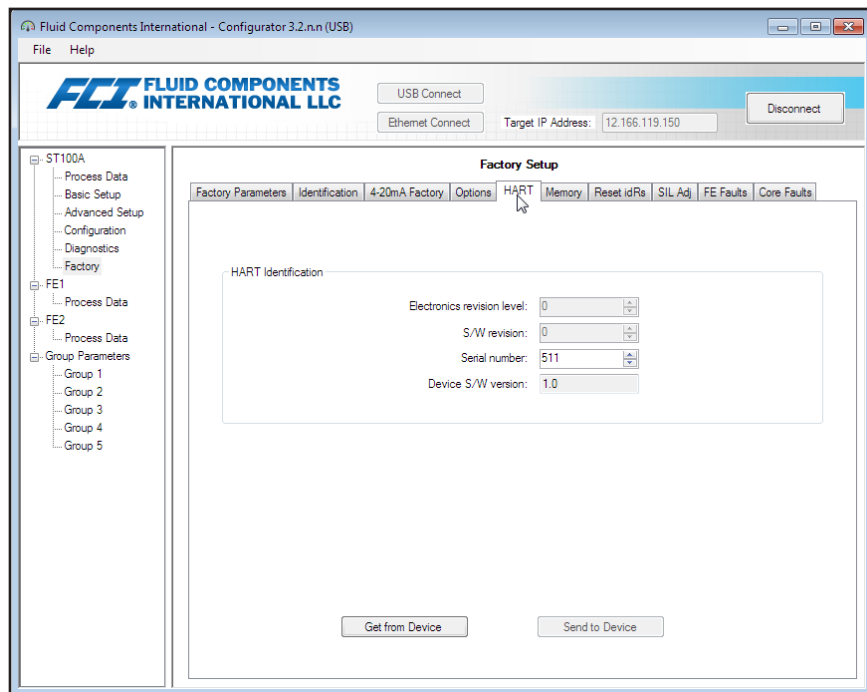


Figure 34 – Example HART Tab (Factory)

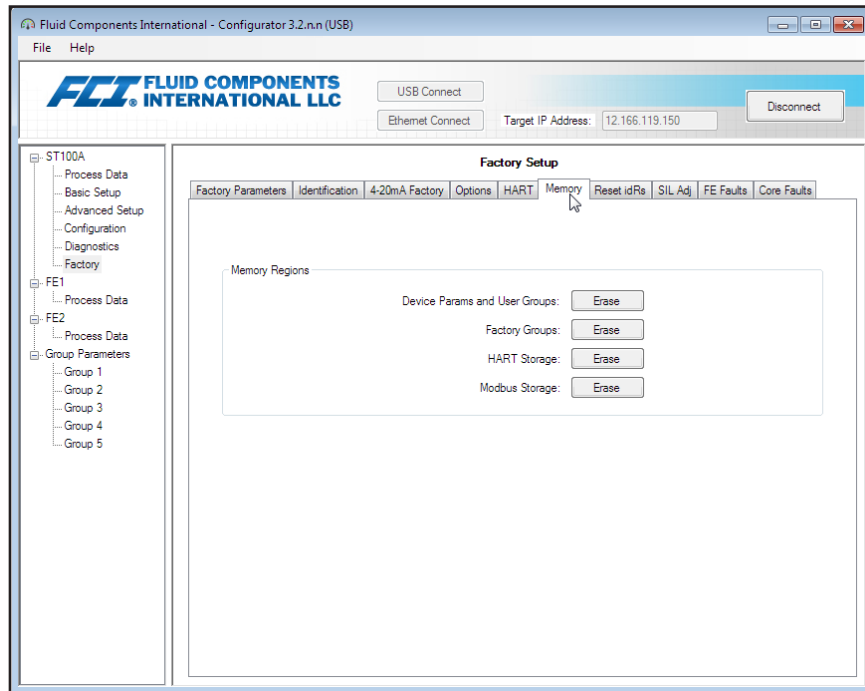


Figure 35 – Example Memory Tab (Factory)

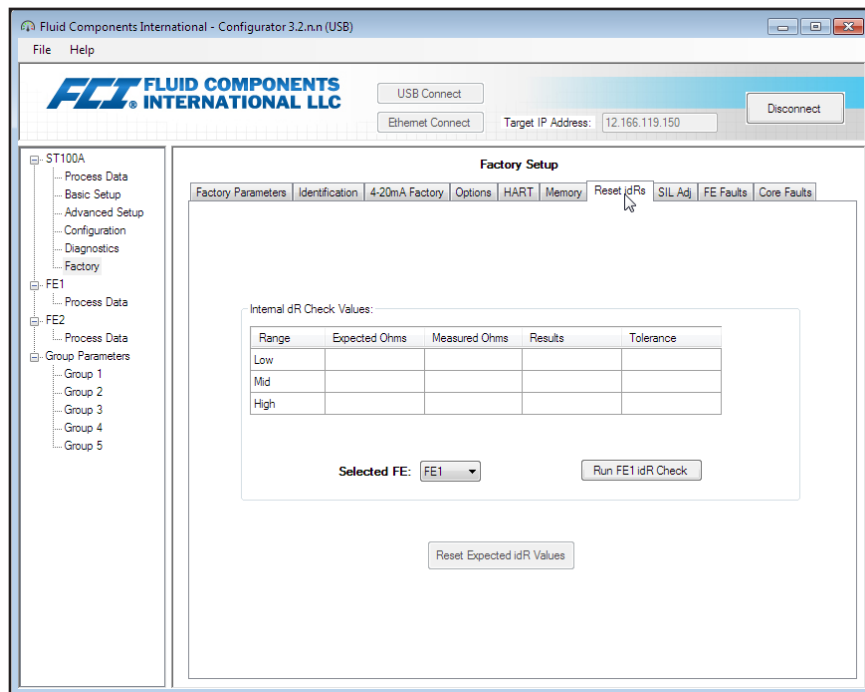


Figure 36 – Example Reset idRs Tab (Factory)

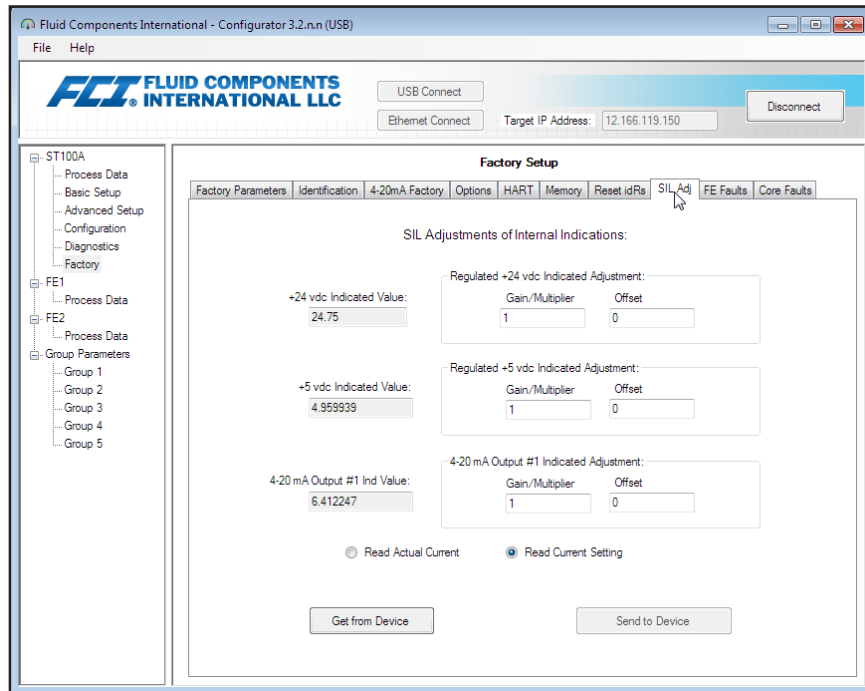


Figure 37 – Example SIL Adj Tab (Factory)

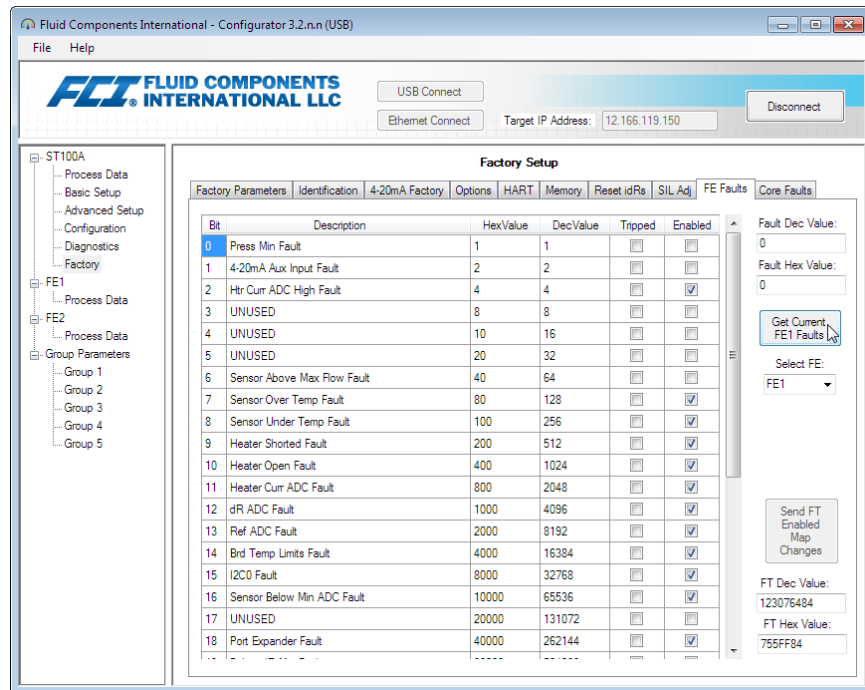


Figure 38 – Example FE Faults Tab (Factory)

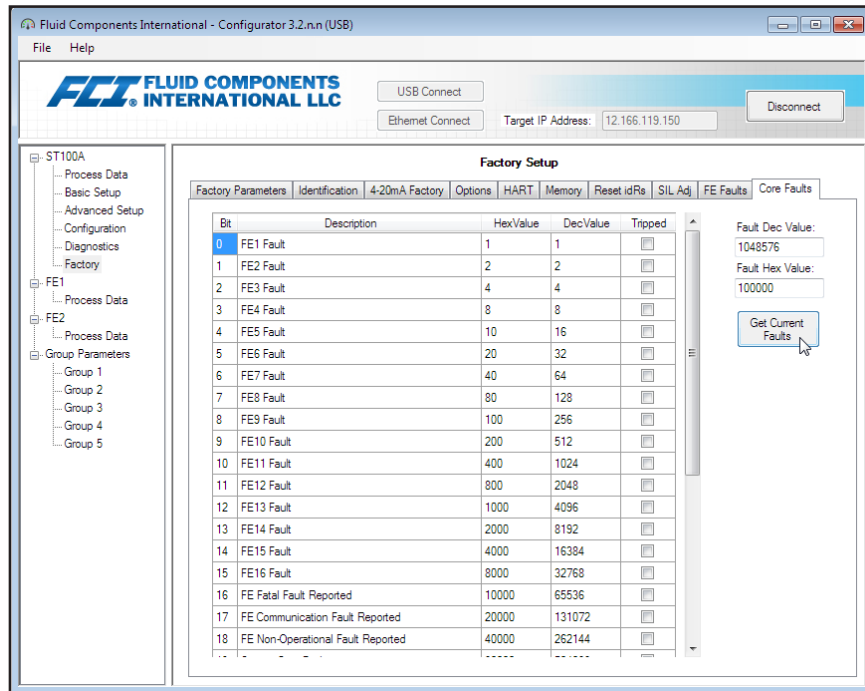


Figure 39 – Example Core Faults Tab (Factory)

FE1-FE2 Process Data

Depending on the system configuration (options), the application menu tree will show process data for either FE1 or FE1 and FE2. For this discussion, we will focus on FE1 (the FE2 process data screen is similar). Select the **FE1 Process Data** branch on the menu tree. The figure below shows an example FE1 Process Data screen (in a 2-point system).

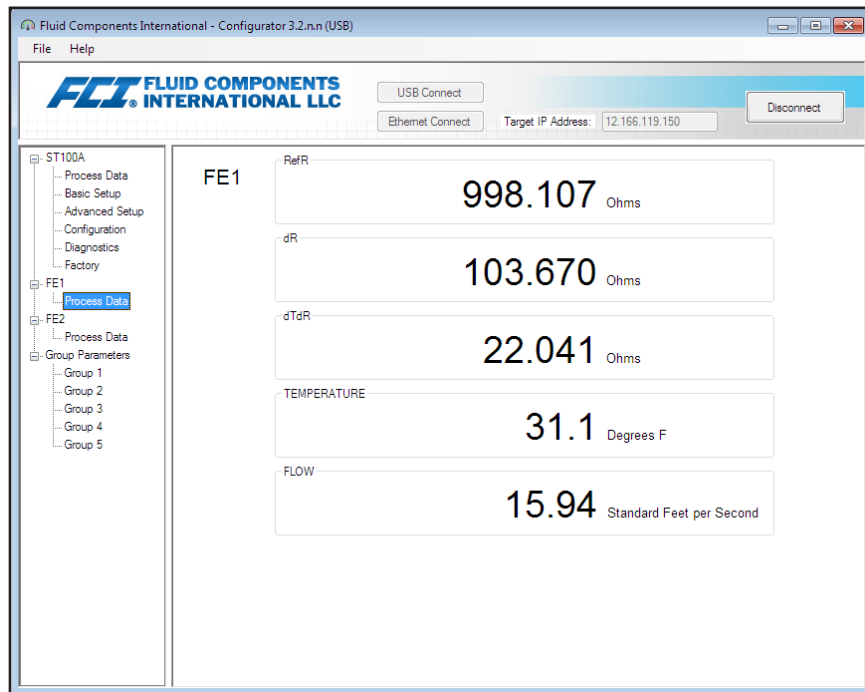


Figure 40 – Example Process Data Screen (FE1)

This screen displays the real time values of the following flow element parameters:

- RefR – Reference RTD resistance
- dR – Delta resistance between the active and reference RTDs
- dTdR – Delta-T/Delta-R resistance, variable relative to process flow rate
- Temperature – Real time temperature value
- Flow – Real time flow value

This screen can be helpful when diagnosing system faults.

Parameter Reports

A **Parameter Reports** screen (under *Group Parameters* in the menu tree) displays the calibration and configuration information saved in the ST100A Series unit for a particular calibration group numbered 1-5. Selecting a parameter report for a particular calibration group displays that group's info/data. As required, make a parameter change using the alphanumeric data entry field in the Parameter Value column. Similar to other setup menus there is a **Send Changes to Device** button to transmit any parameter change to the ST100A. Use of the **Send** button, however, requires the Factory level password.

Note: Some listed parameters are not applicable depending on the instrument model/configuration.

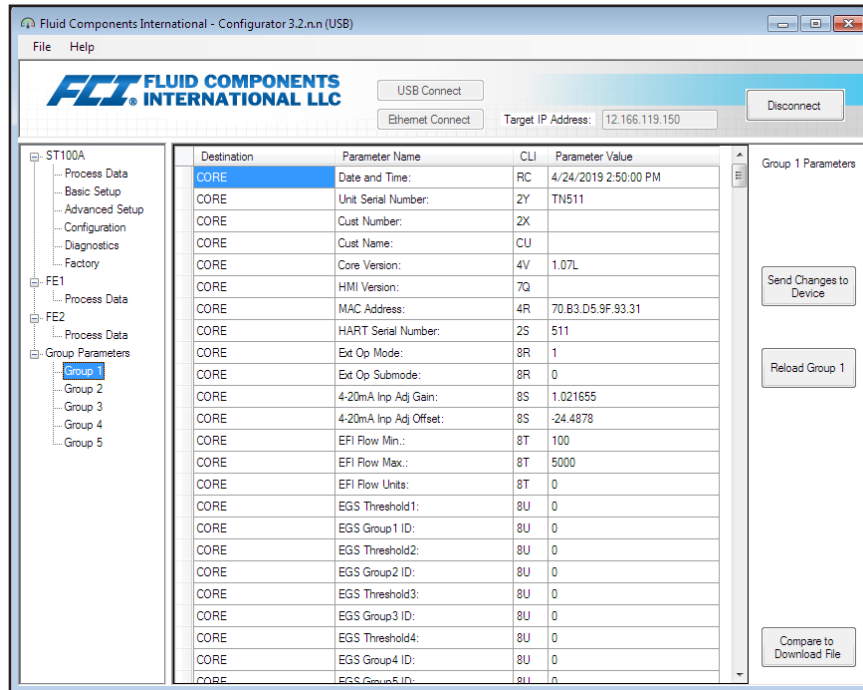


Figure 41 – Example Parameter Report, Group 1

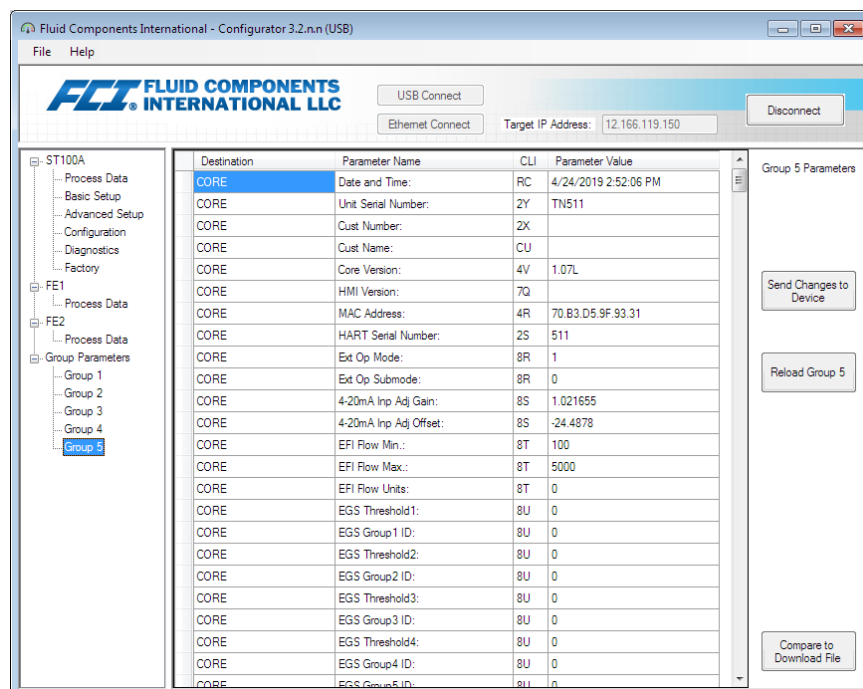


Figure 42 – Example Parameter Report, Group 5

Compare to Download File

Use the **Compare to Download File** button to quickly check the instrument's parameters with a previously saved/downloaded calibration file generated by the Cal2 program at the factory (refer to "Download Calibration" on page 10 for details on how to download the calibration file directly to the instrument). Follow the instructions below to perform the comparison.

1. Click **Compare to Download File**. Observe that an Open File dialog appears.
2. Navigate to the Cal2-generated text file's directory/folder (local drive or network location), select the appropriate file, and then click **Open**.
3. Observe that the parameters list changes to show comparison results with columns showing *Unit Value* (instrument's parameter value), *File Value* (the file's parameter value), and *File Match*. In the File Match column, an unchecked box indicates a parameter mismatch and a checked green box indicates a parameter match. See example screen below. Make individual parameter changes as necessary by clicking **Reload Group x**, typing in the parameter value, and then clicking **Send Changes to Device** (Factory level password required).

Note: The calibration file is a text file with the following default filename format:

SerialNo_CustomerNo_CalGroup_FE/Head.txt.

Example: For an instrument with serial number 492890, customer number C076370, calibration group 1, and a single FE/head, the calibration file filename would be: *492890_C076370_1_1.txt*.

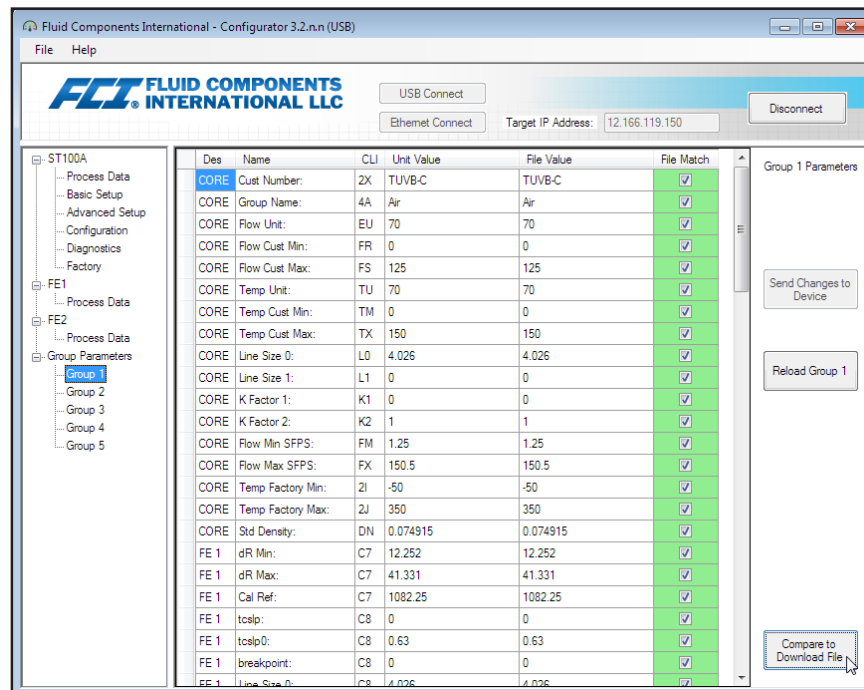


Figure 43 – Example Parameter Report With Download File Comparison Results

4. Customer Service

Customer Service/Technical Support

FCI provides full in-house technical support. Additional technical representation is also provided by FCI field representatives.

By Mail

Fluid Components International LLC
1755 La Costa Meadows Dr.
San Marcos, CA 92078-5115 USA
Attn: Customer Service Department

By Phone

Contact the area FCI regional representative. If a field representative is unable to be contacted or if a situation is unable to be resolved, contact the FCI Customer Service Department toll free at 1 (800) 854-1993.

By Fax

To describe problems in a graphical or pictorial manner, send a fax including a phone or fax number to the regional representative. FCI is available by facsimile if all possibilities have been exhausted with the authorized factory representative. Our fax number is 1 (760) 736-6250; it is available 7 days a week, 24 hours a day.

By Email

FCI Customer Service can be contacted by email at: techsupport@fluidcomponents.com.

Describe the problem in detail making sure a telephone number and best time to be contacted is stated in the email.

International Support

For product information or product support outside the contiguous United States, Alaska, or Hawaii, contact your country's FCI International Representative or the one nearest to you.

After Hours Support

For product information visit the FCI website at www.fluidcomponents.com. For product support call 1 (800) 854-1993 and follow the pre-recorded instructions.

Point of Contact

The point of contact for service, or return of equipment to FCI is your authorized FCI sales/service office. To locate the office nearest you, visit the FCI website at www.fluidcomponents.com.



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